

I Claim:

1. An apparatus for the coating and delivery of beneficial insects which comprises:
- a. a hopper for the temporary storage of insects and which hopper has a constricted opening at the bottom in communication with,
 - b. an insect metering device for controlling the flow of insects from said hopper,
 - c. a delivery tube having an inlet end and an outlet end, and
 - d. a tubular chamber having an outlet end and an inlet end for the introduction of air into said chamber, and having at least one fluid injector, disposed within said chamber, for the introduction of a binder solution from a source thereof, into an airstream,
- said metering device in communication with the inlet of the delivery tube; the outlet of the delivery tube being disposed within the chamber and in communication with the interior of said chamber,
- whereby when air is introduced through the inlet end of the chamber, an airstream is formed that moves through said chamber, and as insects are metered into said delivery tube they are gravity fed to the chamber to be coated by binder solution entering the chamber through said at least one fluid injector, and then the coated insects are expelled through the outlet end of said chamber
2. The apparatus of claim 1 wherein the metering device comprises a motor operated spur gear.
3. The apparatus of claim 1 wherein the metering device comprises a rotating disk having at least one aperture therein.
4. The apparatus of claim 1 wherein the metering device is in direct communication with a collection bin which in turn is in communication with said delivery tube.
5. The apparatus of claim 4 wherein the collection bin has a spout that communicates with the inlet of the collection tube.
6. The apparatus of claim 1 wherein the delivery tube comprises a J-shaped tube the outlet of which is directed toward the outlet of the chamber.
7. The apparatus of claim 1 wherein the delivery tube is a J-shaped tube having a flared outlet end, said outlet of which is directed toward the outlet of the chamber and the metering device comprises a rotor.
8. The apparatus of claim 1 wherein each binder solution injector is disposed at about a 45 degree angle toward the outlet of said chamber.
9. The apparatus of claim 1 further including a stirrer mounted for rotation within the hopper to prevent the clogging thereof.

10. An apparatus for the coating and delivery of beneficial insects which comprises:

a. a hopper for the temporary storage of the beneficial insects and which hopper has a constricted opening at the bottom in communication with,
b. an insect metering device for controlling the flow of insects from said hopper,
c. a collection bin to receive said insects, in communication with said metering device,
d. a delivery tube having an inlet end and an outlet end, and
e. a tubular chamber having an outlet end and an inlet end for the introduction of air into said chamber, and having at least one fluid injector, disposed within said chamber, for the introduction of a binder solution from a source thereof, into an airstream,

said collection bin in communication with the inlet of the delivery tube; the outlet of the delivery tube being disposed within the chamber and in communication with the interior of said chamber,

whereby when air is introduced through the inlet end of the chamber, an airstream is formed that moves through said chamber, and as insects are metered into said delivery tube they are gravity fed to the chamber to be coated by binder solution entering the chamber through said at least one fluid injector, and then the coated insects are expelled through the outlet end of said chamber.

11. The apparatus of claim 10 wherein the metering device comprises a motor operated spur gear.

12. The apparatus of claim 10 wherein the metering device comprises a rotating disk having at least one aperture therein.

13. The apparatus of claim 10 further including a stirrer mounted for rotation within the hopper to prevent the clogging thereof.

14. The apparatus of claim 10 wherein the collection bin has a spout that communicates with the inlet of the delivery tube and further wherein the delivery tube is a J-shaped tube the outlet of which is directed toward the outlet of said chamber.

15. The apparatus of claim 10 further including an optical sensor, connected to a power source, mounted at the inlet end of the delivery tube to monitor the flow into the delivery tube.

16. The apparatus of claim 15 wherein there are two injectors mounted in opposed position, each of which is directed at a 45 degree angle toward the outlet of the chamber.

17. The apparatus of claim 10 wherein the hopper, metering device and collection bin are all disposed within a housing, having an opening therein in communication with said hopper.

18. The apparatus of claim 10 further including means for mounting the apparatus to an airplane.

1 19. The apparatus of claim 10 wherein the chamber's inlet end is configured as a reverse
2 venturi and the delivery tube has an outwardly flared outlet..

3 20. The apparatus of claim 10 further including a pressure regulator in fluid communication
4 with the at least one injector to control the flow of binder to the at least one injector.

5 21. The apparatus of claim 10 further including blower means connected to the inlet end of the
6 chamber.

7 ~~22. An apparatus for the aerial delivery of binder-coated beneficial insects which comprises:~~

8 a. a hopper for the temporary storage of the insects and which hopper has a constricted
9 opening at the bottom in communication with,

10 b. an insect metering device for controlling the flow of insects from said hopper,

11 c. a collection bin to receive said insects, in communication with said metering device,

12 d. a J-shaped delivery tube having an inlet end and an outlet end,

13 e. an optical sensor encircling said delivery tube, connected to a power source, and
14 adapted to monitor the flow through said delivery tube,

15 f. a tubular chamber having an outlet end and a reverse venturi configured inlet end for
16 the introduction of air into said chamber, and having at least a pair of fluid injector, oppositely
17 disposed within said chamber, for the introduction of a binder solution from a source thereof,
18 into an airstream,

19 said collection bin in communication with the inlet of the delivery tube; the outlet of
20 the delivery tube being disposed within the chamber and in communication with the interior
21 of said chamber,

22 whereby when air is introduced through the inlet end of the chamber, an airstream is
23 formed that moves through said chamber, and as insects are metered into said delivery tube
24 they are gravity fed to the chamber to be coated by binder solution entering the chamber
25 through said at least one fluid injector, and then the coated insects are expelled through the
26 ~~outlet end of said chamber.~~

27 23. The apparatus of claim 22 further including a motorized stirrer disposed in said hopper to
28 prevent clogging of the constricted opening, and the metering device comprises a motorized
29 spur gear.

30 24. The apparatus of claim 22 further including coupling means for mounting a backpack
31 blower thereto.

32 25. The apparatus of claim 22 including means for mounting the apparatus on one of an
33 airplane and a tractor.

34 ~~26. The process of controlling insect pests on an infested specific crop which comprises:~~

- 1 a. introducing a plurality of beneficial insects into a moving airstream within a chamber
2 having an air inlet and an air outlet,
3 b. injecting a binder solution into the airstream,
4 c. coating the moving beneficial insects with the binder solution,
5 d. expelling the coated insects from the airstream through the outlet of the chamber
6 onto the specific crop.

7 27. The process of delivering beneficial insects to the foliage of infested target trees which
8 comprises:

- 9 a. mounting at least one tubular chamber, each of which has an air inlet end and an air
10 outlet end onto an airplane, with the air inlet of each chamber facing forward,
11 b. placing a finite amount of the beneficial insects into a hopper in communication with
12 the chamber,
13 c. metering a continuous supply of beneficial insects into the chamber from the hopper
14 while flying over the target trees,
15 d. injecting a binder solution into the chamber during the time the beneficial insects are
16 in the chamber;
17 e. coating the beneficial insects with the binder solution, within the chamber,
18 ~~f. expelling the coated insects out the outlet of the chamber onto the target trees.~~

19 28. The process of claim 27 including the extra step of monitoring the flow of the insects into
20 the chamber by optically sensing the flow.

21 29. The process of claim 27 including the step of slowing down the speed of the air entering
22 each chamber prior to the introduction of the beneficial insects thereto.

23 ~~30. The process of claim 27 the metered beneficial insects are axially introduced into the~~
24 ~~chamber.~~

25 30/ 31. The process of claim 29 wherein the injecting of the binder solution transpires at a 45
26 degree angle to the flow of the insects within the chamber.